Designed for Video Editing Professionals

PRO EX

PCI-express Expander

Installation and User's Manual

Document 900-0007-0 v1

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1. Introduction

We appreciate your purchase of the PRO EX from Dulce Systems. The PRO EX is a PCI-express (PCI-e) peer-to-peer expansion enclosure and Uplink Host Adapter that allows the user to add up to seven PCI-e add-in cards. The PRO EX is compliant to the PCI Express Base Specification, version R1.0a. The Host Computer link to the PRO EX enclosure is via a PCI-e x8 link via a PCI-e x8 cable. The PCI-e x8 cable connects to the PRO EX Uplink Host Adapter Card inserted into a host computer such as a Mac or a PC. By placing the PCI-e Uplink card into a computer and then connecting via the cable to the PRO EX enclosure, the user can greatly expand their PCI-e capability.

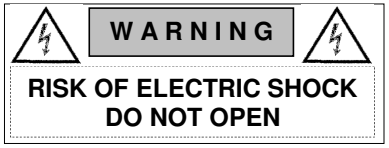
The PRO EX enclosure provides one x8 lane PCI-e upstream port, seven x8 PCI-e expansion slots, three are x8 speed rated and four are x4 speed rated.

The seven expansion slots will accommodate half length (174 mm) full height PCI-e cards with x8 physical slot size or smaller.

A mixture of PCI-e based storage SATA RAID Controllers, Adapters, Interfaces can be installed in the PRO EX to create a very large storage expansion box. Using seven Dulce PRO DQ SATA RAID subsystems, a total of 56TB can be made available online. If more is needed, additional PRO EX can be daisy chained to expand even more online storage.

1.1. Safety Considerations

1.1.1. SAFETY CONSIDERATIONS



WATER AND MOISTURE
To reduce the risk of fire or electrical shock, do not expose unit to rain or moisture. Do not operate unit near water – such as: bathtub, washbowl, kitchen sink or laundry tub, wet basement, or near a swimming pool.

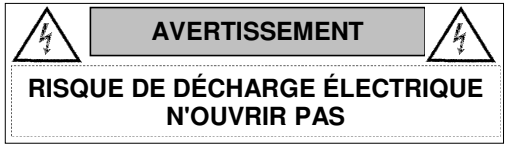
STABILITY
Do not place this unit on an unstable cart, stand, bracket, or table. Unit may fall, causing serious injury.

VENTILATION
Do not block front and rear ventilation. Proper airflow is required to ensure reliable operation and prevents unit from over heating. Do not place unit in an enclosed space where no or insufficient ventilation is available.

ELECTRICAL
Do not defeat the safety purpose of the grounding power plug. The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon or against them.

SERVICING
Do not attempt to service this unit yourself. Opening or removing the top, side and rear covers will expose you to dangerous voltages or other hazards.

1.1.2. CONSIDÉRATIONS DE SÉCURITÉ



EAU ET HUMIDITÉ
Pour réduire le risque de feu ou de choc électrique, n'exposez pas d'unité pour pleuvoir ou l'humidité. Ne faites pas marcher d'unité près de l'eau – comme; la baignoire, la cuvette, l'évier ou la cuve de blanchisserie, la cave mouillée ou près d'une piscine.

STABILITÉ
Ne placez pas cette unité sur un chariot instable, un éventaire, une parenthèse ou une table. L'unité peut tomber, en provoquant la blessure sérieuse.

VENTILATION
Ne bloquez pas de devant et élevez la ventilation. L'écoulement d'air nécessaire est tenu de garantir l'opération sûre et prévient l'unité de sur le chauffage. L'unité ne peut pas placé dans un espace fermé où aucune ventilation ou dans suffisant n'est disponible.

ÉLECTRIQUE
Ne vainquez pas le but de sécurité de la prise de courant de pouvoir de bases. La corde de pouvoir devrait être mise en déroute pour qu'ils ne seront pas probablement marchés sur ou pincés par les articles placés sur ou contre eux.

ENTRETIEN
N'essayez pas d'assurer l'entretien de cette unité vous-même. En s'ouvrant ou le fait d'enlever le haut, le côté et les couvertures arrière vous exposeront aux voltages dangereux ou à d'autres hasards.

1.1.3. SAFTY BERÜCKSICHTIGUNGEN

WASSER UND FEUCHTIGKEIT
Um eine Brand- oder Elektroschockgefahr weitgehend auszuschließen, Gerät nicht Regen oder Feuchtigkeit aussetzen. Gerät nicht in der Nähe von Bade- oder Waschwannen, Wasch- oder Spülbecken, feuchten Kellern oder Schwimmbecken betreiben.

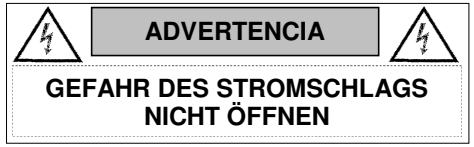
STABILITÄT
Das Gerät nicht auf wacklige Karren, Ständer, Halterungen oder Tische stellen, da es herunterfallen und Verletzungen verursachen könnte.

BELÜFTUNG
Vordere und hintere Belüftungsöffnungen nicht versperren. Das Gerät muss ausreichend be- und entlüftet werden können, damit es sich nicht während des Betriebs überhitzt. Daher darf das Gerät nicht in geschlossenen Räumen aufgestellt werden, in denen keine ausreichende Be- und Entlüftung gewährleistet ist.

STROMVERSORGUNG
Nicht den Schukostecker modifizieren. Das Stromkabel sollte so verlegt werden, dass es nicht durch Auftreten oder durch spitze oder scharfe Gegenstände beschädigt werden kann.

WARTUNG
Das Gerät nicht eigenmächtig warten. Durch das Öffnen des Geräts (Abziehen der oberen, seitlichen und hinteren Abdeckung) setzen Sie sich lebensgefährlichen Spannungen aus.

1.1.4. CONSIDERACIONES DE SEGURIDAD



AGUA Y HUMEDAD
Para reducir el riesgo de fuego o electrochoque, no exponga la unidad para llover o humedad. No haga funcionar la unidad cerca del agua – como; bañera, lavatorio, fregadero o tina de lavandería, sótano mojado o cerca de una piscina.

ESTABILIDAD
No coloque esta unidad en un carro inestable, soporte, soporte o mesa. La unidad puede caerse, causando la herida seria.

VENTILACIÓN
No bloquee delantero y críe la ventilación. El corriente de aire apropiado es requerido asegurar la operación confiable y previene la unidad de sobre la calefacción. La unidad no puede colocado en un espacio incluido donde ninguna ventilación o en suficiente está disponible.

ELÉCTRICO
No derrote el objetivo de seguridad del enchufe de poder que da buenos conocimientos. La cuerda de poder debería ser derrotada de modo que ellos probablemente no sean andados en o pellizcados por artículos colocados sobre o contra ellos.

REVISIÓN
No intente atender esta unidad usted mismo. Abriéndose o quitar la cumbre, el lado y las tapas traseras le expondrán a voltajes peligrosos u otros riesgos.

1.2. System Requirements

Operating Systems:

- Mac OS X 10.4, 10.5 or higher.
- Windows XP / 2003 / Vista 32/64-bit.

- Apple Mac Pro with one available PCI-e x8 slot.
- Apple Power Mac G5 with one available PCI-e x8 slot.
- Windows compatible PC with one available PCI-e x8 slot.

1.3. Technical Support

Phone	818-435-6007
FAX	818-576-0324
E-mail	support@dulcesystems.com
Web	www.dulcesystems.com

If the product requires service, please contact Dulce Systems' Technical Support and obtain an RMA number. Ship the product properly packaged to:

Dulce Systems
Attn: RMA
9620 Topanga Canyon Place, Suite E Chatsworth, CA 91311

2. Getting Started

The PRO EX comes pre-assembled and ready for use, just install the supplied PCI-e (PCI-express) x8 Uplink Host Adapter in the computer, connect the uplink cable, and install the desired PCI-e cards in the PRO EX expander slots.

2.1. Packaging

Please do not discard the boxes and packing materials in case you might need to reuse them later. Always ship the product in its original packaging. Improperly packaged products will be subjected to shipping damage, for which you will be liable for the repair.

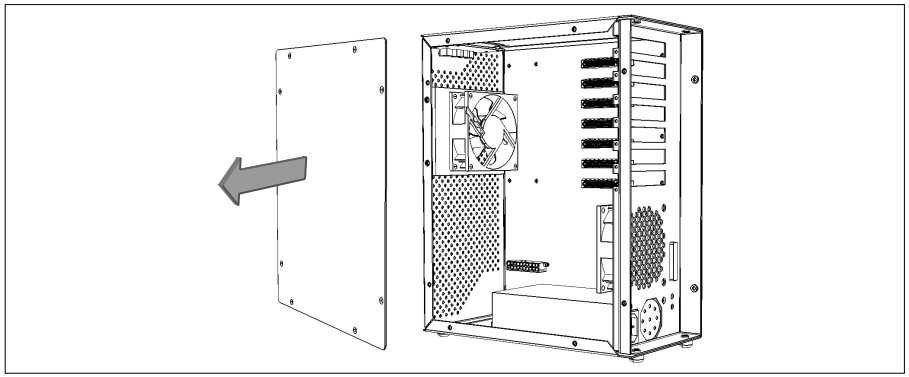
2.2. Check List

- Installation and User's Manual
- PRO EX Expansion Enclosure
- PRO EX PCI-e x8 Uplink Host Adapter
- One 1-meter x8 Uplink cable
- Power Cord (North America user only)

3. Overview

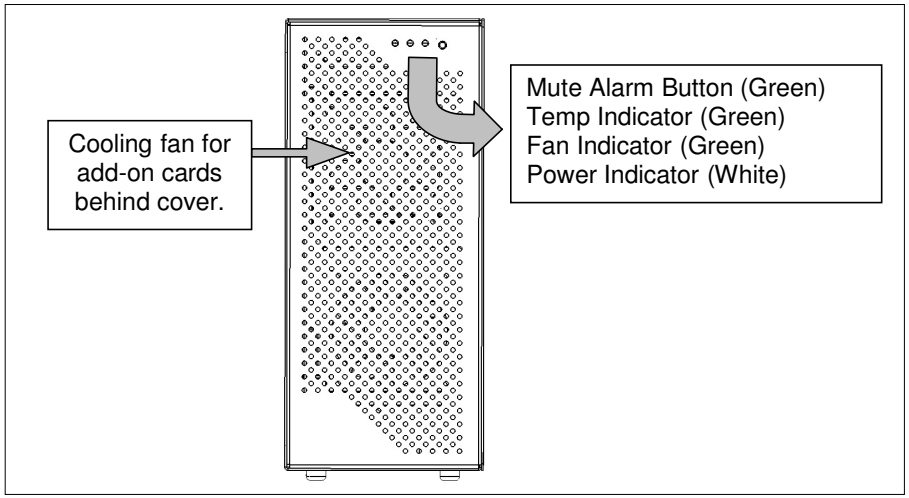
3.1. Removing the Cover

The PRO EX expansion slots are accessible by removing the side cover. Remove the eight Philip screws and remove the cover.



3.2. Front Indicators and Controls

The PRO EX enclosure has stand alone self-monitoring features. It monitors temperature and fan continuously. Should the temperature exceed a safe operating range or the fan spin below a preset minimum, the alarms will be triggered. A red indicator light will come on plus an audible alarm will sound.


Cooling fan for add-on cards behind cover.
Mute Alarm Button (Green)
Temp Indicator (Green)
Fan Indicator (Green)
Power Indicator (White)

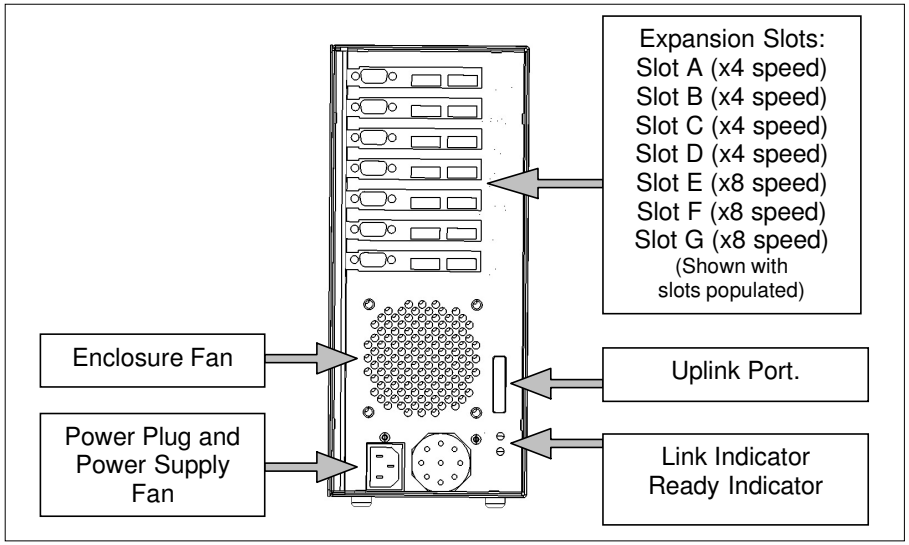
3.3. Rear Indicators and Ports

Uplink Port Connects to Uplink Host Adapter installed in host computer or another PRO EX via an x8 Uplink Cable.

Link Indicator Green when uplink link is established.

Ready Indicator Green when PRO EX is ready for operation.

Power Plug Power source input. Note there is no power on / off switch. PRO EX power state is remotely controlled by Uplink Host Adapter and host computer. Uplink cable must be attached for remote power control to operate.

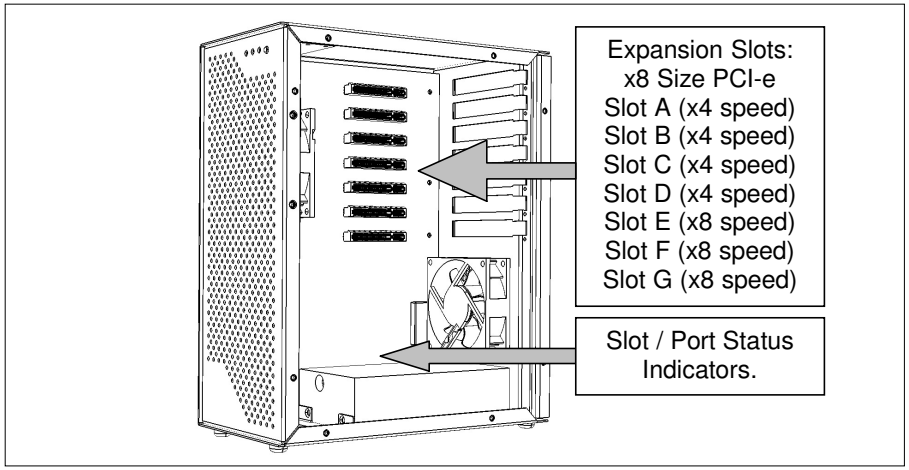


3.4. Internal Indicators and Expansion Slots

Expansion Slots Seven PCI-e expansion slots can accommodate half length (174mm) full height PCI-e cards, with x8 lane or less. Each slot is rated for 24W max power.

Slot / Port Status Indicator A green status for a particular slot / port indicates that the slot / port link has trained to at least x1 width.

LED towards the rear is for Slot A, Slot B, C etc moving towards the front ending with the Uplink Port.



4. Installation

- Turn of the computer and remove the power cord.
- Do not install the power cord for the PRO EX until after installation of all add-on cards are completed.
- PRO EX has remote power control. There is no power on/off switch on the PRO EX, power is controlled by the Uplink Host Adapter installed in the host computer. When the host computer is on, the PRO EX will come on, when the host is turned off, the PRO EX will turn off.

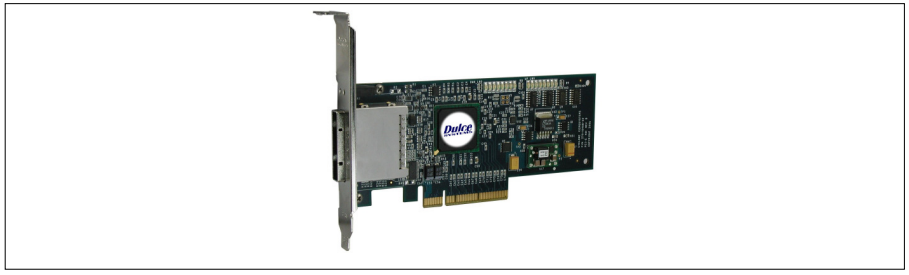
The PRO EX is a PCI-e expander, which consists of an Uplink Host Adapter, a Uplink Cable, and the expander enclosure. Additional user supplied PCI-e add-on cards are installed in the PRO EX enclosure. The add-on cards can be Dulce Systems' SATA RAID Controllers, eSATA Adapters, FireWire / USB Adapters as well as 3rd party RAID Controllers or any PCI-e compliant cards can fit into the PRO EX enclosure.

4.1. Uplink Host Adapter Installation

An available PCI-e slot is required in the computer to install the PRO EX Uplink Host Adapter. The slot must allow for an x8 physical card, however the speed of the slot can be of x8 or slower. No drivers are required for the Uplink Host Adapter and the Adapter is Mac and PC compatible.

The Uplink Host Adapter is rated for x8 speed which will produce the optimum performance. But in some cases due to limitations of the computer, a slower speed (x4 or slower) might be required to provide a balanced speed setting for other PCI-e cards within the computer system.

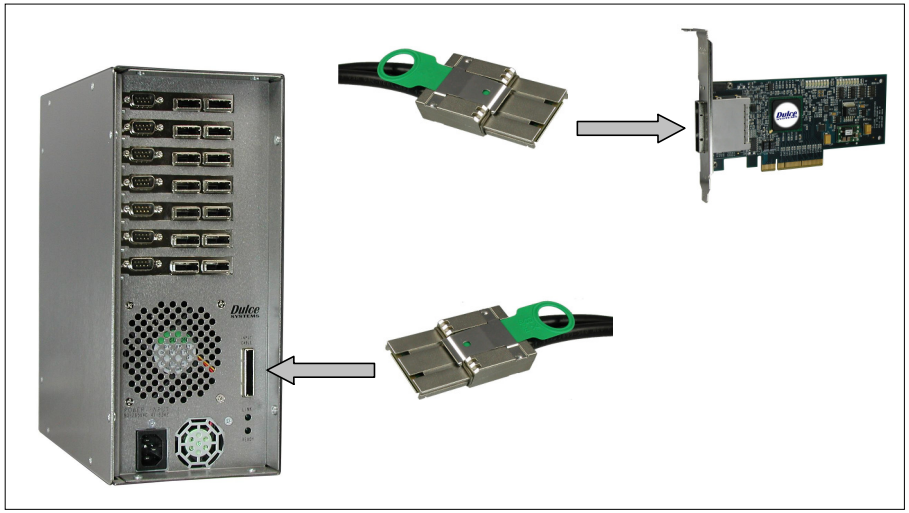
For Mac Pro installations, slot 3 or 4 (top two) are recommended. Mac Pros built on and after January 2008 have fixed speed of x4 in slots 3 and 4. Mac Pros before January 2008 might require setting of slot speed using the Expansion Slot Utility.



PRO EX x8 Uplink Host Adapter

4.1. Uplink Cable Installation

Connect the x8 Uplink Cable to the Uplink Host Adapter and PRO EX. Maximum length is 3-meters.

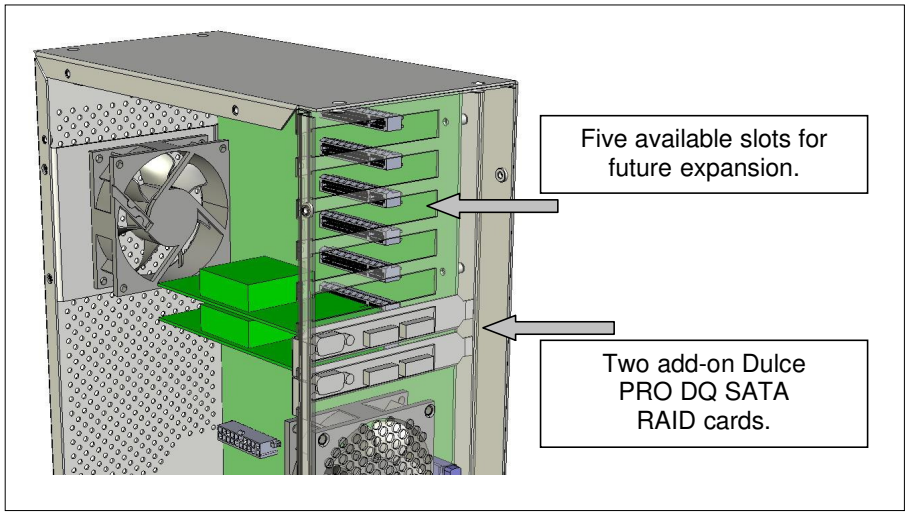


4.2. User Add-on Card Installation

Remove the cover to access the PCI-e expansion slots, install the desired PCI-e card in an empty slot. All seven PRO EX expansion slots will accommodate x8 physical add-on cards. Slots A, B, C and D are rated for x4 speed and slots E, F and G are rated for x8 speed. All the add-on cards in the PRO EX enclosure share the same Uplink Port speed*.

The add-on cards simply show up on your computer as if they were directly attached inside the system. Drivers that are normally required for the particular add-on cards are still required and installs as normal.

* Performance is not compromised due to the high efficient design of the PRO EX, even at the slower x4 uplink speed setting, data rate of over 750MB/sec is achieved using a pair of Dulce PRO DQ SATA RAIDs.

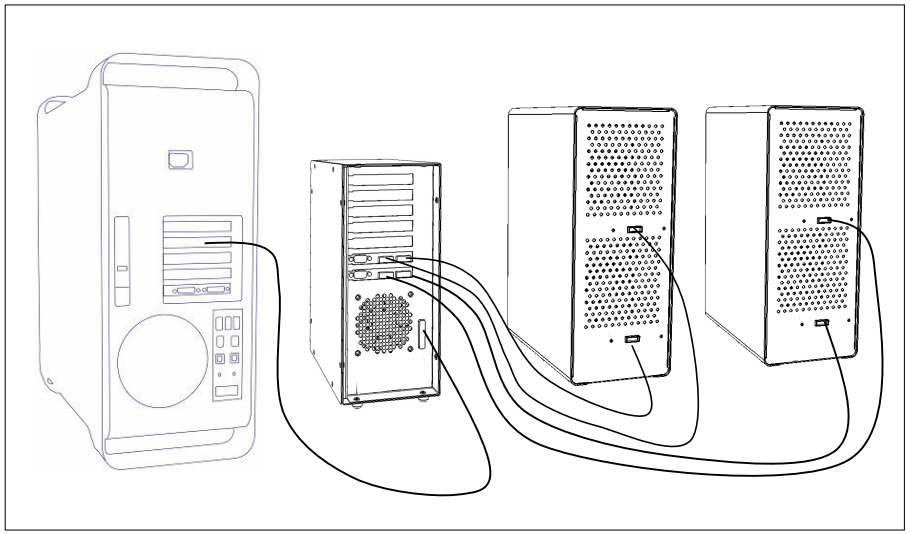


Example of PRO EX populated with two SATA RAID Controllers.

4.3. Connecting It All

When your storage demand is out pacing slots available in your workstation, the PRO EX provides an additional seven slot expansion to an external enclosure.

Example shown here is a Mac Pro with two Dulce PRO DQ attached to the PRO EX leaving five available slots for future expansion. A total of seven add-on cards can be added to the PRO EX enclosure.



PRO EX connected to a Mac Pro and two Dulce PRO DQs.

4.4. System Profile

The PRO EX Uplink Host Adapter and the PRO EX Expansion Enclosure provides bridging function to extend the PCI-e signals outside the host computer motherboard. The Mac System Profile shows the details of the PCI devices.

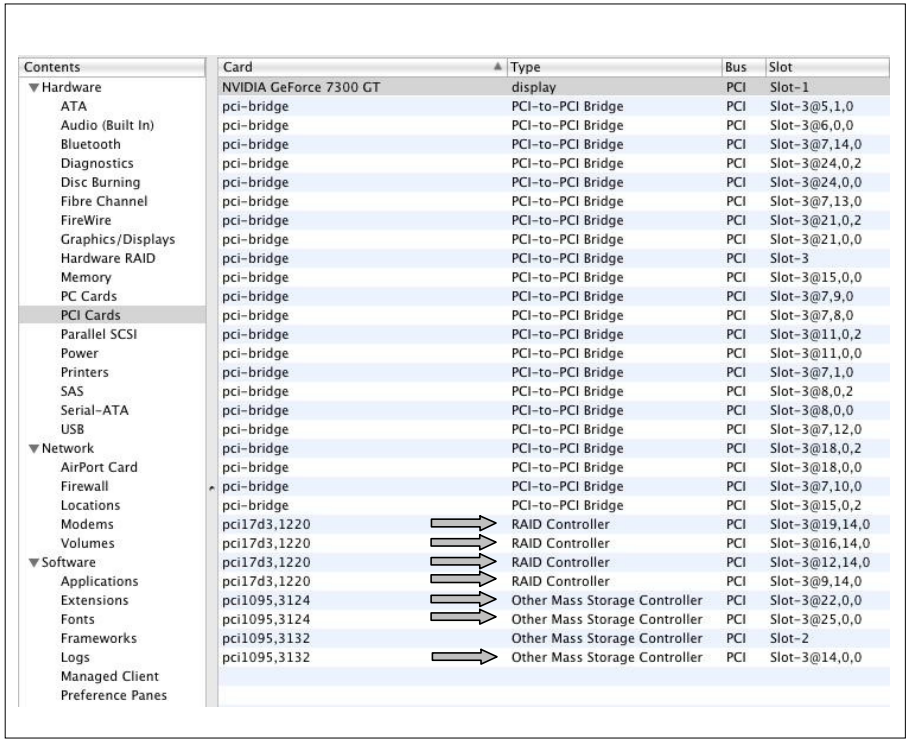
Example of System Profile with the follow configuration:

In the Mac Pro

Slot 1: NVIDIA display card.
Slot 2: A two port eSATA card that is part of the Dulce Duo-eSATA.
Slot 3: PRO EX Uplink Host Adapter.
Slot 4: Empty.

In the PRO EX Expansion Enclosure

All add-on cards are listed under Slot 3.
Four Dulce Duo Quad SATA RAID Controllers.
Three Other Mass Storage Controllers.



Contents	Card	Type	Bus	Slot
▼Hardware	NVIDIA GeForce 7300 GT	display	PCI	Slot-1
ATA	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@5,1,0
Audio (Built In)	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@6,0,0
Bluetooth	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@7,14,0
Diagnostics	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@24,0,2
Disc Burning	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@24,0,0
Fibre Channel	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@7,13,0
FireWire	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@21,0,2
Graphics/Displays	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@21,0,0
Hardware RAID	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3
Memory	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@15,0,0
PC Cards	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@7,9,0
PCI Cards	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@7,8,0
Parallel SCSI	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@11,0,2
Power	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@11,0,0
Printers	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@7,1,0
SAS	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@8,0,2
Serial-ATA	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@8,0,0
USB	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@7,12,0
▼Network	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@18,0,2
AirPort Card	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@18,0,0
Firewall	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@7,10,0
Locations	pci-bridge	PCI-to-PCI Bridge	PCI	Slot-3@15,0,2
Modems	pci17d3,1220	RAID Controller	PCI	Slot-3@19,14,0
Volumes	pci17d3,1220	RAID Controller	PCI	Slot-3@16,14,0
▼Software	pci17d3,1220	RAID Controller	PCI	Slot-3@12,14,0
Applications	pci17d3,1220	RAID Controller	PCI	Slot-3@9,14,0
Extensions	pci1095,3124	Other Mass Storage Controller	PCI	Slot-3@22,0,0
Fonts	pci1095,3124	Other Mass Storage Controller	PCI	Slot-3@25,0,0
Frameworks	pci1095,3132	Other Mass Storage Controller	PCI	Slot-2
Logs	pci1095,3132	Other Mass Storage Controller	PCI	Slot-3@14,0,0
Managed Client				
Preference Panes				

4.5. Driver Installation

No drivers are necessary to use the PRO EX. Add-on cards installed in the PRO EX are seen as if they were connected directly in the host computer, and drivers for each particular add-on card are still needed.

The PRO EX Uplink Host Adapter and the PRO EX Expansion Enclosure registers as PCI-to-PCI Bridge, add-on cards are registers as devices behind these bridges.

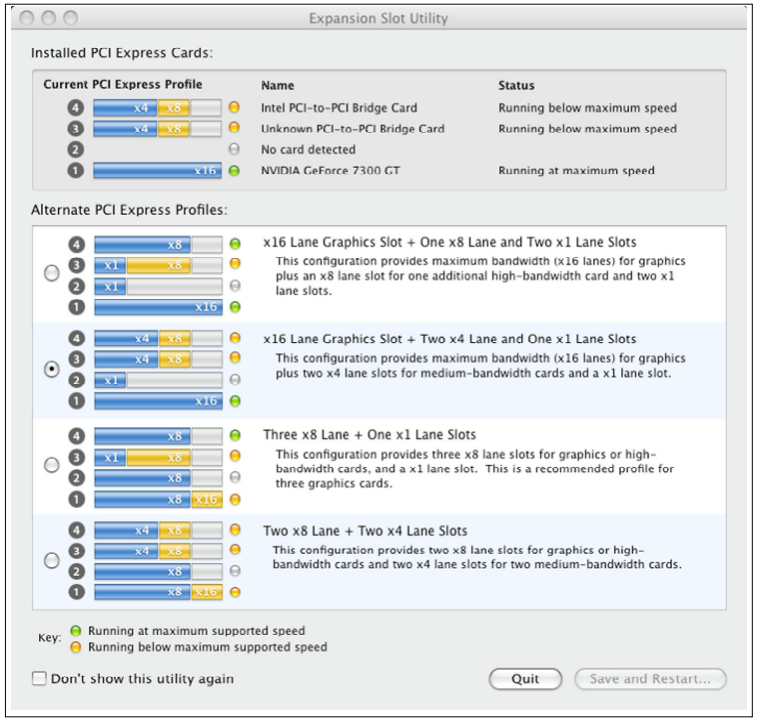
4.5.1. Mac Pro – Expansion Slot Utility settings

This section applies exclusively to the Apple Mac Pro built before January 2008, this section can be skipped for all other computers.

The Mac Pro (Intel Xeon-based) will detect changes in the PCI-e slot configuration, it will automatically launch the Expansion Slot Utility where you can make performance adjustments for the various PCI-e slots. The utility can be manually started also, it can be found at: Under my Mac Pro: /System/Library/CoreServices.

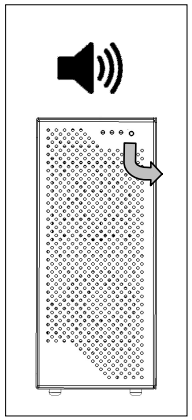
Ensure there is at least a x4 speed assignment for the slot where the PRO EX Uplink Host Adapter is installed, making sure also that your video capture / playback card and video display card also get a sufficient x value.

Example below is a good balance, it shows the PRO EX in slot 3 set for x4 speed, a popular video capture card in slot 4 also in x4 speed, and the standard graphic card in slot 1 at x16 speed.


Expansion Slot Utility
Installed PCI Express Cards:
Current PCI Express Profile
Name
Status
Intel PCI-to-PCI Bridge Card
Running below maximum speed
Unknown PCI-to-PCI Bridge Card
Running below maximum speed
No card detected
NVIDIA GeForce 7300 GT
Running at maximum speed
Alternate PCI Express Profiles:
x16 Lane Graphics Slot + One x8 Lane and Two x1 Lane Slots
This configuration provides maximum bandwidth (x16 lanes) for graphics plus an x8 lane slot for one additional high-bandwidth card and two x1 lane slots.
x16 Lane Graphics Slot + Two x4 Lane and One x1 Lane Slots
This configuration provides maximum bandwidth (x16 lanes) for graphics plus two x4 lane slots for medium-bandwidth cards and a x1 lane slot.
Three x8 Lane + One x1 Lane Slots
This configuration provides three x8 lane slots for graphics or high-bandwidth cards, and a x1 lane slot. This is a recommended profile for three graphics cards.
Two x8 Lane + Two x4 Lane Slots
This configuration provides two x8 lane slots for graphics or high-bandwidth cards and two x4 lane slots for two medium-bandwidth cards.
Key:
Running at maximum supported speed
Running below maximum supported speed
Don't show this utility again
Quit
Save and Restart...

Expansion Slot Utility can be found at the
Boot drive > System > Library > CoreServices.

5. Alarm Conditions



Enclosure Alarms
(Audible and red indicators):

- Temperature (enclosure detected over heating condition)
- Fan (enclosure cooling fan not operational, could lead to over heating)

Mute Alarm: Enclosure audible alarm can be muted by pressing the green mute button above the indicators, the red indicator remains on until the condition is corrected.

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6. Limited Warranty

WHAT THE WARRANTY COVERS

Dulce Systems warrants your product against any defect in material and workmanship and conforms to Dulce published specifications under normal use.

WHAT THE WARRANTY DOES NOT COVER

The warranty does not cover equipment which has been damaged due to accident, misuse, abuse, fire, flood, "Acts of God," or other contingencies beyond our control; use of incorrect line voltages; improper or insufficient ventilation; failure to follow operating instructions; or improper or unauthorized repair; improperly packaged for shipping; packaged in non-approved shipping container; shipping damage.

The warranty is voided by removal or alteration of the product or parts identification labels.

Dulce has no liability for general, consequential, incidental or special damages. These include loss of recorded data, the cost of recovery of lost data, lost profits and the cost of the installation or removal of any Products, the installation of replacement Products, and any inspection, testing, or redesign caused by any defect or by the repair or replacement of Products arising from a defect in any Product.

WHAT THE WARRANTY PERIOD IS

Dulce Systems warrants your PRO EX product for 12 months. The warranty period begins at the date of shipment to the original end user, company or organization.

Our warranty applies to repaired or replaced Products for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced Product, whichever is longer.

WHAT WE WILL DO TO CORRECT THE PROBLEM

We may elect which remedy or combination of remedies to provide at our sole discretion. We shall have a reasonable time after determining that a defective Product exists to repair or replace a defective Product. Our replacement Product under its limited warranty will be manufactured from new or reconditioned parts.

Your exclusive remedy for any defective Product is limited to the repair or replacement of the defective Product.

We will return the repaired or replacement Product to you prepaid using the same method of shipping (ex: overnight, ground, 2nd day, …) as was shipped to us. If a more expedited return shipping method is required, extra charges might apply at our discretion.

HOW YOU CAN GET SERVICE

Contact our Technical Support to obtain a RMA (Return Materials Authorization) number. The model number, serial number, and description of the problem will be required. A valid proof of purchase might be required to further validate the Products warranty eligibility, the valid proof of purchase document must show the product model, serial number, purchase date, and supplier name. If the valid proof of purchase is not available, the original manufacturing date of the product will be used to determine the warranty period.

No returns will be accepted without a RMA number. We reserve the right to refuse the delivery of the return.

You shall bear all shipping, packing and insurance costs and all other costs, excluding parts and labor, necessary to effectuate repair or replacement under this warranty.

All products returned to us must be shipped in the original packaging or Dulce approved packaging. If you do not have the original packaging, call us to request packaging. A nominal fee will be charged for the requested packaging and for shipment. Ship the RMA to us pre-paid.

Products that are improperly packaged for shipping; packaged in a non-approved shipping container; or incur shipping damages are not covered under warranty.

HOW STATE LAW RELATES TO WARRANTY

In the United States, some states do not allow exclusion or limitation of incidental or consequential damages, so the limitations above may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

PRO EX Installation and User's Manual

7. Product Registration

REGISTER NOW

Please visit our web site and register online.

www.dulcesystems.com/register

A valid proof of purchase might be required to further validate the Products warranty eligibility, the valid proof of purchase document must show the product model, serial number, purchase date, and supplier name. If the valid proof of purchase is not available, the original manufacturing date of the product will be used to determine the warranty period.

www.dulcesystems.com